

BeeHive204

Extremely fast universal 4x 48-pin drive **concurrent production programmer (multiprogramming system)**.

Short description:

- **57923** supported devices from **260** manufacturers by 2.75 version of SW (21. Dec. 2010)
- four independent **universal programming modules** (BeeProg2 based) in one unit
- two BeeHive204 multiprogrammers can be attached to one PC to better utilize programming workplace
- **extremely fast programming**, one of the fastest programmers in this category. Programs 64Mbit NOR Flash memory less than 9 seconds and **1Gbit NAND Flash less than 70 sec.**
- **powerful** independent **pin driver** circuit for each and every pin of the programmer
- **in-circuit programming** capability through ISP connector
- Very low voltage support for latest Flash memory chips
- **ESD protection** on each pin of the sockets
- **USB** (up to 480 Mbit/s) interface to PC
- comfortable and easy to use control program, **Windows 98/Me/NT/2000/XP/2003/XPx64/Vista/7** compatible
- unique quick reaction to customer's needs - software update can be ready within a day from request by OnDemand software
- approved by CE laboratory to meet CE requirements
- made in Slovakia
- **warranty - 3 years**



Optional accessories:

- **Programming Adapters** (Socket Converters)
- Optional accessories: Calibration test POD, Vacuum pen, ...

Features

GENERAL

- **BeeHive204** programmer is practically identical with the BeeHive4+ programmer, difference is "only" much higher programming speed (20-70%) of high-capacity memories.
- **BeeHive204** is extremely fast universal 4x 48-pin drive **concurrent multiprogramming system** designed for high volume production programming with minimal operator effort. The chips are programmed at near theoretical maximum programming speed.
- **BeeHive204** consists of four independent isolated **universal programming modules**, based on the BeeProg2 programmer hardware. Therefore the sockets can run asynchronously (concurrent programming mode). Each programming module starts programming at the moment the chip is detected to be inserted in the socket properly - independently on the status of other programming modules. It result, three programming modules works while you replace the programmed chip at the fourth.
- Modular construction of hardware - the programming modules works independently - allows for continuing operation when a part of the circuit becomes inoperable. It also makes service quick and easy.
- **Hands-free operation:** asynchronous and concurrent operation allows a chip to begin programming immediately upon insertion of a chip. The operator merely removes the finished chip and inserts a new chip. Operator training is therefore minimized.
- Supports **all kinds** of types and silicon technologies of today and tomorrow **programmable devices** without family-specific module. You can be sure the next devices support require the software update and (if necessary) simple package convertor (programming adapter), therefore **the ownership cost are minimized**.
- Using built-in in-circuit serial programming (**ISP**) connector, the programmer is able to program ISP capable chips in circuit.
- Provides very competitive price coupled with excellent hardware design for reliable programming. Probably **best "value for money"** programmer in this class.
- **Very fast programming** due to high-speed FPGA driven hardware and execution of time-critical routines inside of the programmer. At least fast than competitors in this category, for many chips much faster than most competitors. As a result, when used in production this programmer waits for an operator, and not the

other way round.

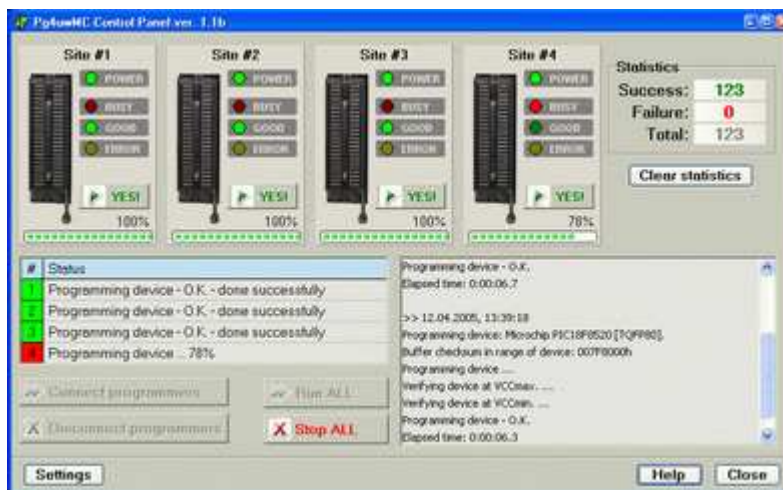
- BeeHive204 interfaces with the IBM PC compatible, portable or desktop personal computers through **USB** (2.0) port.
- Banana jack for ESD wrist straps connection to easy-to-implement the ESD protection control.

HARDWARE (valid for each programming module)

- **FPGA based** totally reconfigurable 48 **powerful TTL pindrivers** provide H/L/pull_up/pull_down and read capability for each pin of socket. Advanced pindrivers incorporate **high-quality high-speed** circuitry to deliver signals without overshoot or ground bounce for all supported devices. Pin drivers operate down to 1.8V so you'll be ready to program the full range of today's advanced low-voltage devices.
- Each programming module performs device **insertion test** (wrong or backward position) and **contact check** (poor contact pin-to-socket) before it programs each device. These capabilities, supported by **overcurrent protection** and **signature-byte check** help prevent chip damage due to operator error.
- The selftest capability allow to run diagnostic part of software to thoroughly check the health of the each programming module.
- Built-in **protection circuits** eliminate damage of the programming module and/or programmed device due to environment or operator failure. All ZIF socket pins inputs and all pins of ISP connector of BeeHive204 programmer are **protected against ESD** up to 15kV.
- BeeHive204 programmer performs programming **verification** at the **marginal level** of supply voltage, which, obviously, improves programming yield, and guarantees long data retention.
- Various **Programming Adapters (Socket Converters)** are available to handle device in PLCC, SOIC, PSOP, SSOP, TSOP, TSSOP, TQFP, QFN (MLF), SDIP, BGA and other packages.

SOFTWARE (production mode control)

- This part of the software is focused to the easy monitoring of high-volume production operations.
- Operator-friendly control software combines many powerful functions with ease of use. Graphic user interface provide overview of all important activities result without burden of operator with non-important details.

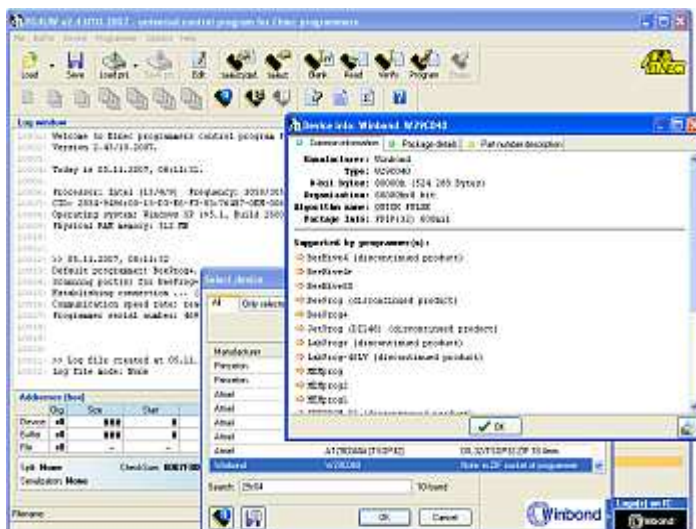


- There is used a **project file** to control the BeeHive204 multiprogramming system. Project file contains user data, chip programming setup information, chip configuration data, auto programming command sequence, etc. Therefore the **operator error is minimized**, because the project file is normally created and proofed by engineering and then given to the operator. The optional **protected mode** can be set for project file to avoid a unwanted changes of the project file.

- Each chip may be programmed with different data such as **serial number, configuration and calibration information**.

SOFTWARE (programming modules driver, engineering mode control)

- This part of the software is focused to the quick and easy preparation of the project file for usage in the production mode control software.
- Each programming module is driven by an **easy-to-use** control program with pull-down menu, hot keys and on-line help. Selecting of device is performed by its class, by manufacturer or simply by typing a fragment of vendor name and/or part number. It is the same years-proven software, as is used for all other Elnec single-site programmers.



available packages are provided. The software provide also **explanation of chip labelling** (the meaning of prefixes and suffixes at the chips) for each supported chip.

CARE FOR THE CUSTOMERS

- **New Device Request (AlgOR Service)**

- It is important to remember, that a support of most of the new devices requires **only a software update**, because the BeeHive204 is based on the truly universal (BeeProg2) programmer. With our prompt service you often can have a new device added to the list of supported devices within hours! See AlgOR (Algorithm On Request) service and OnDemand software for details.
- This service is almost in all cases free. Please note that we can ask customer to share the cost if development cost is too high.

- **Free life-time software updates**

- Most current version of Elnec programmers software with support of newly added devices is available for free here.

- **Free Technical support**

- Elnec provide customers technical support (WebForm/e-mail based) available usually within few hours, at the latest next working day.

- **Keep-Current service**

- Keep-Current service means, that ELNEC ships the latest version of programmer software and updated user documentation (Keep-Current package) to customer . The Keep-Current service is your hassle-free guarantee that you achieving the highest quality programming on ELNEC programmers, at minimal cost.

- **Prompt delivery**

- Combination of extensive stock, flexible manufacturing and shipping of Elnec products by world class carriers (like DHL) warrants customers very fast and secure delivery of ordered Elnec products. Products ordered before 10 a.m. (CET) will be dispatched the same working day (if products are in stock and the payment is done by Online payment (CardPay, PayPal).

- **Warranty**

- Advanced design of the **BeeHive204** production programmer, including protective circuits, original brand components, careful manufacturing and burning-in allow us to provide a **three-year warranty** on parts and workmanship of the programmer (limited 25 000-cycle warranty on ZIF sockets).
- Elnec provides **free shipping of programmer repaired under warranty back to customer world wide**. Warranty is valid from the date of purchase.
- Preferential handling of repair requests ensures registration of the product that should be done within 60 days from the date of purchase here.

Specification (BeeHive204 multiprogramming system)

- 4x universal programming module (4x 48-pin DIL ZIF sockets)
- operation result LEDs, LED power
- USB 2.0 high-speed compatible port
- line power input 100-240VAC/60W max.
- protection against surge and ESD on power supply input
- banana jack for ESD wrist straps connection
- banana jack for connection to ground

Specification (valid for each programming module)

HARDWARE

Base unit, DACs

- USB 2.0 high-speed compatible port, up to 480 Mbit/s transfer rate
- on-board intelligence: powerful microprocessor and FPGA based state machine
- three D/A converters for VCCP, VPP1, and VPP2, controllable rise and fall time
- VCCP range 0..8V/1A
- VPP1, VPP2 range 0..26V/1A
- autocalibration
- selftest capability

ZIF sockets, pindriver

- 48-pin DIL ZIF (Zero Insertion Force) socket accepts both 300/600 mil devices up to 48-pin

- pindrivers: 48 universal
- VCCP/VPP1/VPP2 can be connected to each pin
- perfect ground for each pin
- FPGA based TTL driver provides H, L, CLK, pull-up, pull-down on all pindriver pins
- analog pindriver output level selectable from 1.8 V up to 26V
- current limitation, overcurrent shutdown, power failure shutdown
- ESD protection on each pin of socket (IEC1000-4-2: 15kV air, 8kV contact)
- continuity test: each pin is tested before every programming operation

ISP connector

- 20-pin male type with misinsertion lock
- 6 TTL pindrivers, provides H, L, CLK, pull-up, pull-down; level H selectable from 1.8V up to 5V to handle all (low-voltage including) devices.
- 1x VCCP voltage (range 2V..7V/100mA), can be applied to two pins
- programmed chip voltage (VCCP) with both source/sink capability and voltage sense
- 1x VPP voltage (range 2V..25V/50mA), can be applied to six pins
- target system supply voltage (range 2V..6V/250mA)
- ESD protection on each pin of ISP connector (IEC1000-4-2: 15kV air, 8kV contact)
- two output signals, which indicate state of work result = LED OK and LED Error (active level: min 1.8V)
- input signal, switch YES! equivalent (active level: max 0.8V)

DEVICE SUPPORT

Programmer, in ZIF socket

- EPROM: NMOS/CMOS, 2708*, 27xxx and 27Cxxx series, with 8/16 bit data width, full support for LV series
- EEPROM: NMOS/CMOS, 28xxx, 28Cxxx, 27EExxx series, with 8/16 bit data width
- Flash EPROM: 28Fxxx, 29Cxxx, 29Fxxx, 29BVxxx, 29LVxxx, 29Wxxx, 49Fxxx series, Samsung's K8Fxxxx, K8Cxxxx, K8Sxxxx, K8Pxxxx series, from 256Kbit to 1Gbit, with 8/16 bit data width, full support for LV series
- NAND FLASH: Samsung K9xxx, Hynix HY27xxx, Toshiba TC58xxx, Micron MT29Fxxx, Spansion S30Mxxx, Numonyx (ex STM) NANDxxx
- LBA-NAND: Toshiba THGVNxxx
- mDOC H3: SanDisk (ex M-Systems) SDED5xxx, SDED7xxx, MD2533xxx, MD2534xxx, Hynix HY23xxx
- Multi-chip devices: NAND+RAM, NOR+RAM, NOR+NOR+RAM, NAND+NOR+RAM
- FRAM: Ramtron
- MRAM: Everspin MRxxxxx8x
- NV RAM: Dallas DSxxx, SGS/Inmos MKxxx, SIMTEK STKxxx, XICOR 2xxx, ZMD U63x series
- PROM: AMD, Harris, National, Philips/Signetics, Tesla, TI
- Serial E(E)PROM: Serial E(E)PROM: 11LCxxx, 24Cxxx, 24Fxxx, 25Cxxx, 59Cxxx, 85xxx, 93Cxxx, NVM3060, MDAXxx series, full support for LV series, AT88SCxxx
- Serial Flash: standard SPI (25Pxxx, 25Fxxx, 25Lxxx, 25Bxxx, 25Txxx, 25Sxxx, 25Vxxx, 25Uxxx, 25Wxxx, 45PExx), high performance Dual I/O SPI (25Dxxx, 25PXxxx), high performance Quad SPI (25Qxxx, 26Vxxx), DataFlash (AT45Dxxx, AT26Dxxx)
- Configuration (EE)PROM: XCFxxx, XC17xxxx, XC18Vxxx, EPCxxx, EPCSxxx, AT17xxx, AT18Fxxx, 37LVxx
- 1-Wire E(E)PROM: DS1xxx, DS2xxx
- PLD Altera: MAX 3000A, MAX 7000A, MAX 7000B, MAX 7000S, MAX7000AE, MAX II/G/Z
- PLD Lattice: ispGAL22V10x, ispLSI1xxx, ispLSI1xxxEA, ispLSI2xxx, ispLSI2xxxA, ispLSI2xxxE, ispLSI2xxxV, ispLSI2xxxVE, ispLSI2xxxVL, LC4xxxB/C/V/ZC/ZE, M4-xx/xx, M4A3-xx/xx, M4A5-xx/xx, M4LV-xx/xx, ispCLOCK, Power Manager/II, ProcessorPM
- PLD: Xilinx: XC9500, XC9500XL, XC9500XV, CoolRunner XPLA3, CoolRunner-II
- other PLD: SPLD/CPLD series: AMI, Atmel, AMD-Vantis, Gould, Cypress, ICT, Lattice, NS, Philips, STM, VLSI, TI
- FPGA: Actel: ProASIC3, IGLOO, Fusion
- FPGA: Lattice: MachXO, LatticeXP, ispXPGA
- FPGA: Xilinx: Spartan-3AN
- Clocks: TI(TMS), Cypress
- Special chips: Atmel Tire Pressure Monitoring ATA6285N, ATA6286N, PWM controllers: Zilker Labs, Analog Devices, Gamma buffers: TI, Maxim ...
- Microcontrollers 48 series: 87x41, 87x42, 87x48, 87x49, 87x50 series
- Microcontrollers 51 series: 87xx, 87Cxxx, 87LVxx, 89Cxxx, 89Sxxx, 89Fxxx, 89LVxxx, 89LSxxx, 89LPxxx, 89Exxx, 89Lxxx, all manufacturers, Philips LPC series
- Microcontrollers Intel 196 series: 87C196 KB/KC/KD/KT/KR/...
- Microcontrollers Atmel ARM. ARM7: AT91SAM7Sxx, AT91SAM7Lxx, AT91SAM7Xxx, AT91SAM7XCxx, AT91SAM7SExx series; ARM9: AT91SAM9xxx series; ARM Cortex-M3: AT91SAM3Uxxx series
- Microcontrollers Atmel AVR 8bit/16bit: AT90Sxxxx, AT90pwm, AT90can, AT90usb, ATtiny, ATmega, ATxmega series
- Microcontrollers Atmel AVR32: AT32UC3xxxx
- Microcontrollers Chipcon (TI): CC11xx, CC24xx, CC25xx series
- Microcontrollers Coreriver: Atom 1.0, MiDAS1.0, 1.1, 2.0, 2.1, 2.2, 3.0 series
- Microcontrollers Cypress: CY7Cxxxxx, CY8Cxxxxx
- Microcontrollers ELAN: EM78Pxxx
- Microcontrollers Infineon(Siemens): XC800, C500, XC166, C166 series
- Microcontrollers MDT 1xxx and 2xxx series
- Microcontrollers Microchip PICmicro: PIC10xxx, PIC12xxx, PIC16xxx, PIC17Cxxx, PIC18xxx, PIC24xxx, dsPIC,

PIC32xxx series

- Microcontrollers Motorola/Freescale: HC05, HC08, HC11, HC12, HCS08, RS08, S12, S12X, MC56F, MCF51, MCF52 series
- Microcontrollers Myson MTV2xx, 3xx, 4xx, 5xx, CS89xx series
- Microcontrollers National: COP8xxx series
- Microcontrollers NEC: uPD70Fxxx, uPD78Fxxx series
- Microcontrollers Novatek: NT68xxx series
- Microcontrollers Nuvoton (Winbond): N79xxx, W77xxx, W78xxx, W79xxx, W83xxx series
- Microcontrollers NXP ARM Cortex-M3: LPC13xx, LPC17xx series
- Microcontrollers Philips (NXP) UOC series: UOCIII, UOC-TOP, UOC-Fighter series
- Microcontrollers Philips (NXP) ARM7: LPC2xxx, PCD807xx, SAF7780xxx series
- Microcontrollers Scenix (Uvicom): SXxxx series
- Microcontrollers Renesas: R8C/Tiny series
- Microcontrollers SGS-Thomson: ST6xx, ST7xx, ST10xx, STR7xx series
- Microcontrollers SyncMOS: SM59xxx, SM73xxx, SM79xxx, SM89xxx series
- Microcontrollers & Programmable System Memory STMicroelectronics: uPSD, PSD series
- Microcontrollers STM: ST6xx, ST7xx, ST10xx, STR7xx, STR9xx, STM32Fxx, STM8A/S/L series
- Microcontrollers Silicon Laboratories(Cygnal): C8051 series
- Microcontrollers Texas Instruments: MSP430, MSC12xx series, TMS320F series
- Microcontrollers Texas Instruments (ex Luminary Micro): LM3Sxxx, LM3Sxxxx series
- Microcontrollers ZILOG: Z86/Z89xxx and Z8Fxxxx, Z8FMCxxxxx, Z16Fxxxx, ZGP323xxxxxx, ZLF645xxxxxx, ZLP12840xxxxx, ZLP323xxxxxx series
- Microcontrollers other: EM Microelectronic, Fujitsu, Goal Semiconductor, Hitachi, Holtek, Novatek, Macronix, Princeton, Winbond, Samsung, Toshiba, Mitsubishi, Realtek, M-Square, ASP, Coreriver, Gencore, EXODUS Microelectronic, Megawin, Syntek, Topro, TinyARM, VersaChips, SunplusIT, Nordic, M-Square, QIXIN, Signetic, Tekmos, Weltrend, Amic, Cyrod Technologies, Ember, Ramtron, Nordic Semiconductor, Samsung ...

Programmer, through ISP connector

- Serial E(E)PROM: IIC series, MW series, SPI series, KEELOQ series, PLD configuration memories, UNI/O series
- 1-Wire E(E)PROM: DS1xxx, DS2xxx
- Serial Flash: standard SPI (25xxx), DataFlash (AT45Dxxx, AT26Dxxx)
- Microcontrollers Atmel: AT89Sxxx, AT90pwm, AT90can, AT90usb, AT90Sxxxx, ATtiny, ATmega, ATxmega, AT89LSxxx, AT89LPxxx
- Microcontrollers Atmel AVR32: AT32UC3xxxx
- Microcontrollers Chipcon (TI): CC11xx, CC24xx, CC25xx series
- Microcontrollers Cypress: CY8C2xxxx
- Microcontrollers Elan: EM78Pxxx, EM6xxx series
- Microcontrollers EM Microelectronic: 4 and 8 bit series
- Microcontrollers Microchip PICmicro: PIC10xxx, PIC12xxx, PIC16xxx, PIC17xxx, PIC18xxx, PIC24xxx, dsPIC, PIC32xxx series
- Microcontrollers Mitsubishi: M16C
- Microcontrollers Motorola/Freescale: HC08 (both 5-wire, All-wire), HC11, HC12, HCS08, S12, S12X, MC56F, MCF52 series
- Microcontrollers Nordic Semiconductor: nRF24xxx
- Microcontrollers NEC: uPD7xxx series
- Microcontrollers Philips (NXP): LPC1xxx, LPC2xxx, LPCxx series, 89xxx series
- Microcontrollers Renesas: R8C/Tiny series
- Microcontrollers Realtek, M-Square
- Microcontrollers Scenix (Uvicom): SXxxx series
- Microcontrollers STM: ST7xxx, STR7xx, STR9xx, STM32Fxx, STM8A/S/L series
- Microcontrollers Silicon Laboratories(Cygnal): C8051 series
- Microcontrollers & Programmable System Memory STMicroelectronics: uPSD, PSD series
- Microcontrollers TI: MSP430 (both JTAG and BSL series), MSC12xxx series
- Microcontrollers ZILOG: Z8Fxxxx, Z8FMCxxxxx, Z16Fxxxx series, ZLF645x0xx
- Various PLD (also by Jam/VME/SVF/STAPL/... Player/JTAG support):
 - Altera: MAX 3000A, MAX 7000A, MAX 7000B, MAX 7000S, MAX 9000, MAX II/G/Z
 - Xilinx: XC9500, XC9500XL, XC9500XV, CoolRunner XPLA3, CoolRunner-II
- PLD Lattice: ispGAL22xV10x, ispLSI1xxxEA, ispLSI2xxxE, ispLSI2xxxV, ispLSI2xxxVE, ispLSI2xxxVL, M4-xx/xx, M4LV-xx/xx, M4A3-xx/xx, M4A5-xx/xx, LC4xxxB/C/V/ZC/ZE, ispCLOCK, Power Manager/II, ProcessorPM
- FPGA: Actel: ProASIC3, IGLOO, Fusion
- FPGA: Lattice: MachXO, LatticeXP, ispXPGA

Notes:

- for all supported devices see [actual DEVICE LIST](#)

Package support

- support all devices in DIP with default socket
- package support includes DIP, SDIP, PLCC, JLC, SOIC, SOP, PSOP, SSOP, TSOP, TSOPII, TSSOP, QFP, PQFP, TQFP, VQFP, QFN (MLF), SON, BGA, EBGA, FBGA, VFBGA, UBGA, FTBGA, LAP, CSP, SCSP etc.
- support devices in non-DIP packages up to 48 pins with universal adapters
- programmer is compatible with third-party adapters for non-DIP support

Programming speed

Notes:

- It is important to know, we always use random numbers data pattern for programming speed testing. Some our competitors use "sparse" data pattern, where only few non-blank data are programmed or are there are used data with only few 0 bits (FE, EF, etc.). This cheating approach can "decrease" programming time considerable. If you plan to compare, always ask which pattern they use.
- The programming speed depends on PC speed only slightly.



Device	Size [bits]	Operation	Time
Am29DL640G (parallel NOR Flash)	400080hx16 (64 Mega)	programming and verify	24 sec.
K8P6415UQB (parallel NOR Flash)	400100hx16 bit (64 Mega)	programming and verify	13 sec.
K9F1G08U0M (parallel NAND Flash)	8400000Hx8 (1 Giga)	programming and verify	122.7 sec.
QB25F640S33 (serial Flash)	800200hx8 (64 Mega)	programming and verify	30.7 sec.
AT89C51RD2 (microcontroller)	10000Hx8	programming and verify	14.4 sec.
PIC32MX360F512L (microcontroller)	80000hx8	programming and verify	16.2 sec.
Conditions: PC Pentium 4, 2.4 GHz, 512 MB RAM, USB 2.0, Windows XP.			

SOFTWARE

- **Algorithms:** only manufacturer approved or certified algorithms are used.
- **Algorithm updates:** software updates are available regularly, approx. every 4 weeks, free of charge (Internet download). **OnDemand** version of software is available for highly needed chips support and/or bugs fixes. Available nearly daily.
- **Main features:** revision history, session logging, on-line help, device and algorithm information.

Device operations

- **standard:**
 - intelligent device selection by device type, manufacturer or typed fragment of part name
 - automatic ID-based selection of EPROM/Flash EPROM
 - blank check, read, verify
 - program
 - erase
 - configuration and security bit program
 - illegal bit test
 - checksum
 - interpret the Jam Standard Test and Programming Language (STAPL), JEDEC standard JESD-71
 - interpret the VME files compressed binary variation of SVF files
- **security**
 - insertion test, reverse insertion check
 - contact check
 - ID byte check
- **special**
 - production mode (automatic start immediately after device insertion)
 - lot of serialization modes (more type of incremental modes, from-file mode, custom generator mode)
 - statistic
 - count-down mode

Buffer operations

- view/edit, find/replace
- fill/copy, move, byte swap, word/dword split
- checksum (byte, word)
- print

File load/save

- no download time because programmer is PC controlled
- automatic file type identification/recognition
- **Supported file formats**
 - unformatted (raw) binary
 - HEX: Intel, Intel EXT, Motorola S-record, MOS, Exormax, Tektronix, ASCII-SPACE-HEX, ASCII HEX
 - Altera POF, JEDEC (ver. 3.0.A), eg. from ABEL, CUPL, PALASM, TANGO PLD, OrCAD PLD, PLD Designer ISDATA, etc.
 - JAM (JEDEC STAPL Format), JBC (Jam STAPL Byte Code), STAPL (STAPL File) JEDEC standard JESD-71

- VME (ispVME file VME2.0/VME3.0)

GENERAL

PC system requirements

- Common, software related requirements
- Programmer hardware related requirements:
 - either one USB port, 2.0 compatible

Operation

- operating voltage 100-240V AC rated, 90-264 VAC max., 47-63 Hz
- power consumption max. 60W active
- dimensions 361x234x56 mm (14.2 x 9.2 x 2.2 inch)
- weight (programmer) 3.5kg (7.72 lb)
- operating temperature 5°C ÷ 40°C (41°F ÷ 104°F)
- operating humidity 20%..80%, non condensing

Package includes

Standard accessories:

- BeeHive204 programmer
- USB connection cable PC-programmer
- diagnostic POD for ZIF socket selftest of the programmer (1x)
- diagnostic POD for ISP connector selftest of the programmer (1x)
- ISP cable (4x)
- anti-dust cover for ZIF socket (4x)
- user manual (both on CD and printed form)
- software CD
- calibration test report
- transport case (wooden box + cardboard box)

Bonus pack:

- ESD wrist strap with cord and banana plug
- Vacuum pen
- Gift (surprise)

Additional services

- Keep Current - ELNEC sends to user the latest version of programmer software and updated user documentation (Keep-Current package)
- AlgOR (Algorithms On Request) - add new supported devices on customer request

Programmer price also includes

- free technical support (hot line)
- free life-time software update via Internet

The information in this document are subject to change without notice.